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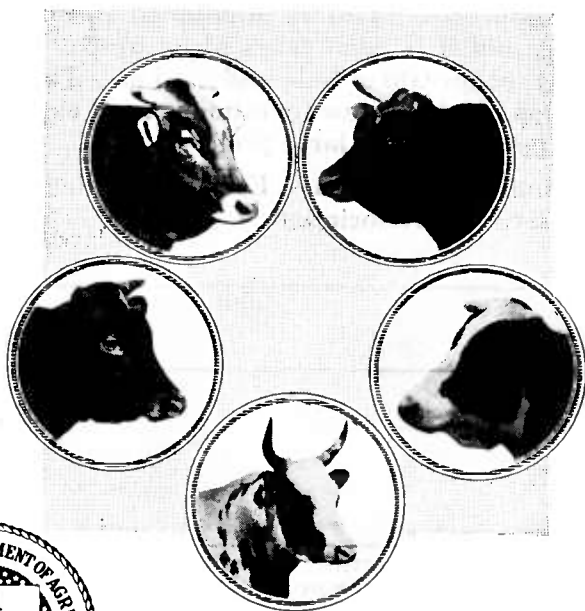
U. S. DEPARTMENT OF AGRICULTURE

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DAIRY-HERD IMPROVEMENT

through

COOPERATIVE BULL ASSOCIATIONS



COOPERATIVE BULL ASSOCIATIONS are formed by farmers for the joint ownership, use, and exchange of purebred bulls which they could not own individually.

Every dairy herd should be carefully selected and have a good bull at its head. A good bull sires productive daughters. The dams may be selected scrubs, the daughters become productive grades, and the granddaughters become high grades of very large production. This is intelligent, constructive breeding, and it is what takes place in every well-managed cooperative bull association. The bull association combines low investment, light expenses, and the possibilities of large profits.

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DAIRY-HERD IMPROVEMENT THROUGH COOPERATIVE BULL ASSOCIATIONS

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INTRODUCTION

THE ULTIMATE GOAL of bull-association work is not better bulls but better cows. It is true, however, that these better cows can come only through the use of better sires. In many cases, the cheapest and best way to get first-class purebred bulls is through the work of the cooperative dairy-bull association. This is a farmers' organization composed of at least three divisions called blocks. Its chief purpose is the breeding of better dairy cows through the joint ownership, use, and systematic exchange of three or more prepotent purebred dairy bulls with high-producing ancestry. If possible, these bulls should be better bred and better individuals than the best cows in any herd of the association.

Few dairymen are so situated financially that they can afford to purchase a really first-class purebred bull for a medium-sized or small herd of dairy cows; but every dairyman, regardless of the size of his herd or the condition of his pocketbook, can well afford to own a share in such a bull. In fact, the small dairyman with only a few cows from which he obtains his income is the very one who needs a high-producing dairy herd. He is the man who can least afford the great losses that come from carelessness in breeding. Though the bull association is adapted to purebred as well as grade herds, to large herds and to those of smaller size, to herds of high production and to those of low production, it is especially adapted to the building up of high-producing dairy herds in those districts where the herds are small.

When the 1920 census was taken only 25 per cent of the dairy bulls of the United States and only 3 per cent of all the dairy cattle were purebred, and there was only 1 purebred bull to each 23 dairy farms. That is not a good record for a great dairy country. To improve

this condition, the first step should be to eliminate all bulls except the purebreds; the next, to prove all the purebred bulls through the records of their daughters and to eliminate all whose daughters are unsatisfactory. The bull association is one of the means by which



FIG. 1.—First bulls purchased by one bull association



FIG. 2.—First tested daughters of bulls shown in Figure 1

these results may be brought about. Figure 1 shows the first bulls purchased by one bull association, and Figure 2, the first tested daughters of these bulls.

HOW BULL ASSOCIATIONS HAVE GROWN IN NUMBER

The growth of a movement does not always prove its value; but in the case of dairy-bull associations, the continued and almost constant growth since the work began is at least some indication of what

the dairymen of this country think of this method of cooperative breeding.

The work began in Michigan in 1908. Before the end of that year there were 3 bull associations, all in that State. In 1910 there were 9 associations, 8 in Michigan and 1 in Minnesota. In 1915 there were 15 associations in 7 States; in 1920, 123 associations in 30 States; and on January 1, 1927, 248 associations in 33 States, Pennsylvania ranking first with a total number of 43. Idaho was second with 31. Minnesota was third with 20.

On January 1, 1927, the membership of the 248 associations was 6,057. These associations owned 1,117 bulls, 8,749 purebred cows, and 30,115 cows that were not purebred. The total number of cows was 41,174, including 2,310 cows whose breeding was not reported. The

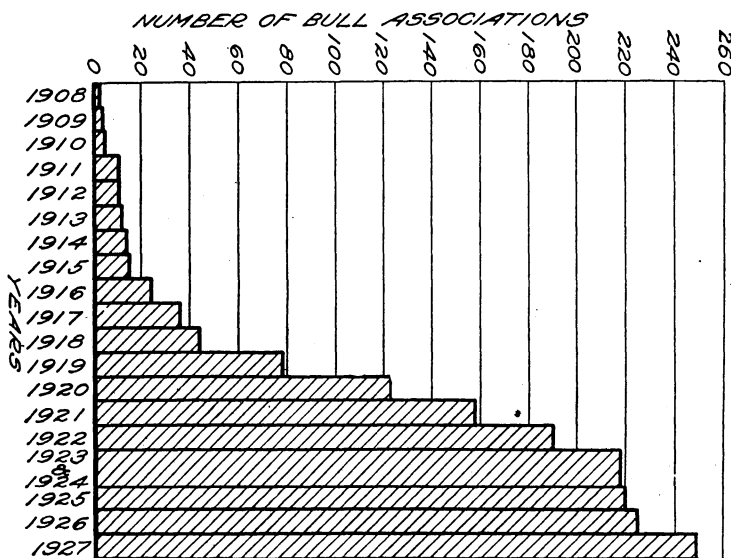


Fig. 3.—Growth of bull associations in the United States, 1908–1927¹

growth of these associations in number has not been especially rapid but each year has showed a gain and the results have been very satisfactory. Figure 3 shows the yearly growth of bull associations throughout the United States.¹

WHAT BULL ASSOCIATIONS ARE ACCOMPLISHING

The growing interest in bull-association work has come largely because this is a practical and economical way of building up better dairy herds. The appearance of the daughters indicate the value of the sire, but their production records prove his value. This is especially true when their records have been compared with the records of their dams.

¹ Previous to 1924 the reports were dated July 1 of each year. No report was made for July 1, 1924, the next being Jan. 1, 1925. The figures are now being compiled for Jan. 1 of each year.

Such comparison of records, of course, can not be made until some of the daughters are old enough to have completed or nearly completed their first lactation periods. Because of this delay, cow-testing-association records of the dams and daughters in bull-association herds have become available slowly. So far, however, they have shown that the bull association has been successful in its main purpose, the building up of better herds of dairy cattle.

There are 155 yearly production records of the daughters of bull-association bulls now available from 12 States. These have been compared with the yearly records of the dams of the daughters. These are not the records of selected daughters but of all those that have been tested and whose records have been compared with the records of the dams. On the average the dams produced 7,112



FIG. 4.—Some members of a calf club organized as a result of the interest created by one bull association

pounds of milk and 299 pounds of butterfat a year, and the daughters 8,071 pounds of milk and 342 pounds of butterfat. On an average the daughters excelled their dams 13.5 per cent in milk production and 14.4 per cent in butterfat.

These percentage gains would not mean much if the dams were low producers, but it requires a bull much above the average purebred bull to raise the production of his daughters above that of dams that produce each year approximately 7,000 pounds of milk and 300 pounds of butterfat. In order to make a fair comparison between the records of immature and mature cows the records of all immature cows are figured to maturity. For cows 2, 3, and 4 years of age, this is done by multiplying the records made at these ages by 100 and dividing the result by 70, 80, and 90, respectively.

Some of the sires were very outstanding. One was mated with dams having an average yearly milk production of 9,300 pounds and an average yearly butterfat production of 347 pounds. The seven

daughters of this bull produced 57 per cent more milk and 44 per cent more butterfat than the average of their dams. More remarkable still, every daughter excelled her dam.

Another bull was mated with cows having an average yearly butterfat production of 254 pounds. His six daughters averaged 38 per cent more butterfat than that quantity. Another sire was mated with dams having an average yearly butterfat production of 256 pounds. His five daughters produced 37 per cent more butterfat than their dams.

Not every bull-association sire increases the production of his daughters over that of their dams. Records are now available for 12 bull-association bulls, each having five or more daughters. Among these 12 there are 9 whose daughters produced more milk and butterfat than their dams and 3 whose daughters produced less. It is interesting to compare two of these sires. One was mated with cows having an average yearly milk production of 7,419 pounds, yet his daughters on an average excelled their dams by 1,645 pounds. The other bull was mated with cows having an average yearly milk production of 7,306 pounds, and his daughters produced on an average 1,038 pounds less than their dams. In each case the average milk production of the dams was about equal, but there was a big difference in the average production of the daughters. Certainly there is a great difference even in purebred bulls, and the production records of the dams and daughters show how great that difference is.

THE DAUGHTERS OF A HUNDRED SIRES

Cow-testing-association figures have furnished the yearly production records of many pairs of dams and daughters. From these figures a hundred dairy sires have been proved as far as five or more pairs of dam and daughter records will prove a sire. Included among these proved-sire records are the records of the daughters of the 12 bull-association bulls already mentioned. In every case the yearly record of the dam has been compared with that of the daughter after all records of immature cows were figured to maturity. Altogether there were 641 daughters whose records were compared with those of their dams.

On an average the dams produced 8,084 pounds of milk and the daughters 8,752 pounds; the dams 349 pounds of butterfat and the daughters 371 pounds. On an average the daughters excelled the dams in milk production by 8.3 per cent and in butterfat production by 6.3 per cent. The daughters of 67 sires excelled their dams in production of milk, and the daughters of 72 sires excelled their dams in production of butterfat. Among the hundred sires there were 33 whose daughters failed to equal their dams in yearly production of milk and 28 whose daughters failed to equal their dams in yearly production of butterfat. Some of these bulls might have increased the production of herds having a lower production average; perhaps many of them would have increased the production of an average herd; but only the sires that raised the production of their daughters above that of the dams of the daughters were worthy to be in the herds in which they were used.

IS THE PROPOSITION BANKABLE?

If money used in any safe investment will earn more than the interest charged, the proposition is said to be a bankable one. Bankers have lent money to farmers many times to help finance the purchase of purebred bulls. When two bull associations were organized in a dairy district in western Pennsylvania a few years ago, one of the local banks helped to finance the purchase of bulls. Not a dollar of these loans was lost, because the money was lent to progressive farmers who invested it in a paying proposition.

It is not easy to determine exactly how much the best association bulls earn for their owners because so many factors must be considered, but it is very easy to show that these bulls return much more than ordinary interest on the money invested in them. In order to demonstrate the possible money value of good bulls, the records of the 6 best sires of the 12 bull-association bulls mentioned above were arranged in the order of the gain in butterfat production of the daughters over that of the dams of the daughters. The results are shown in Table 1.

TABLE 1.—*Estimated value of good proved sires, based on actual records of dams and daughters*

Number of sire	Average butterfat production per cow		Average gain of daughters over dams	Number of daughters	Value of gain at 40 cents per pound butterfat		Amount of money on interest at 6 per cent to earn as much as the gain of the daughters
	Dams	Daughters			For one daughter	For all daughters	
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>				
1.....	347	500	153	7	\$61.20	\$428.40	\$7, 140.00
2.....	254	350	96	6	38.40	230.40	3, 840.00
3.....	256	351	95	5	38.00	190.00	3, 166.66
4.....	185	260	75	11	30.00	330.00	5, 500.00
5.....	156	228	72	8	28.80	230.40	3, 840.00
6.....	250	308	58	5	23.20	116.00	1, 933.33

The average production of the daughters of each sire was multiplied by 10 to determine what the total would be for 10 daughters, but these sires may eventually have many times that number of daughters. Figuring on the gains of 10 daughters for each sire, the first sire earns 6 per cent annually on \$10,200; the second, 6 per cent on \$6,400; and the third, 6 per cent on \$6,333.

The completed tabulation shows that the average gain of all the daughters of the 12 sires was 52 pounds of butterfat a year, or 520 pounds for 10 such daughters. At 40 cents a pound the value of the increased production would amount to \$208 for the 10 daughters, or \$2,080 if the sire had 100 daughters which averaged 52 pounds of butterfat more than their dams. At 6 per cent it would require \$34,667 to earn \$2,080 interest in a year.

To be sure, since some of these bulls will prove unsatisfactory and the others will grow too old for service, all will finally have to be replaced; but long before this must be done most of them will have earned many times their original cost. Not only do these bulls raise the average production of the daughters above the dams, but they

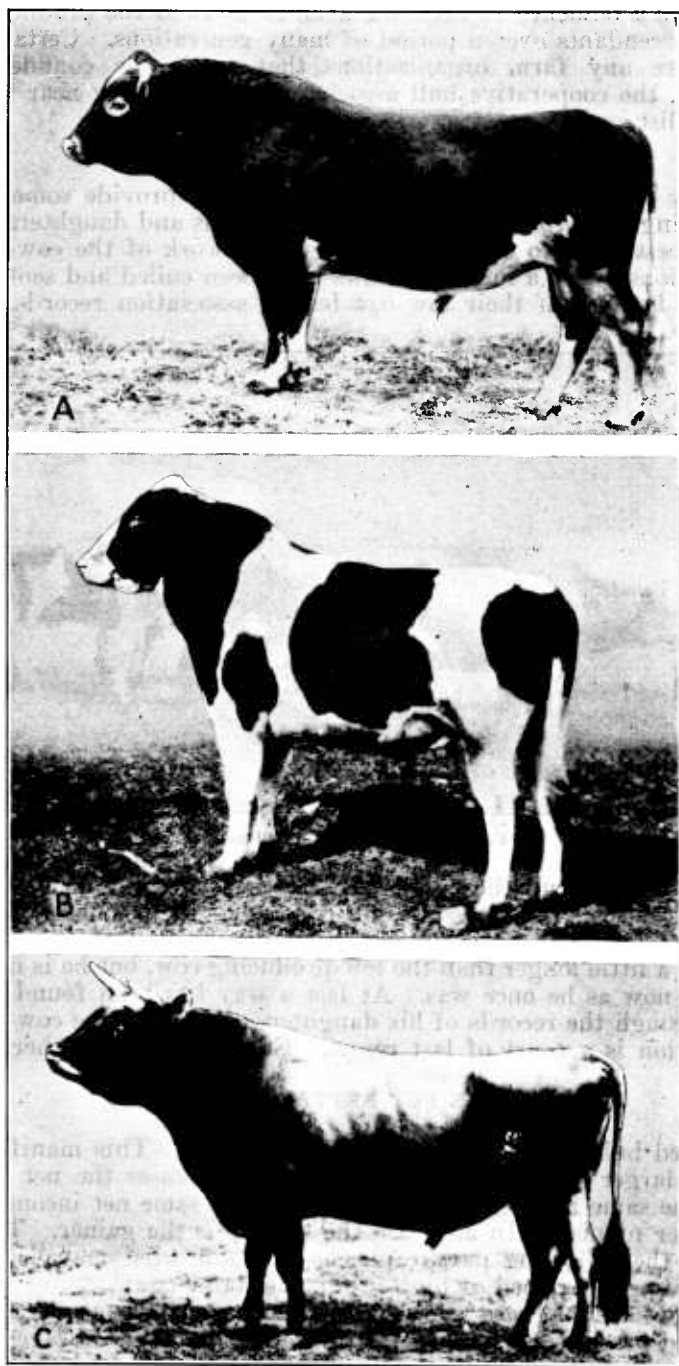


FIG. 5.—Bull-association bulls. A, Guernsey; B, Holstein-Friesian; C, Jersey

also have a tendency to raise the average level of the production of their descendants over a period of many generations. Certainly, if there are any farm organizations that merit the confidence of bankers, the cooperative bull association must be very near the top of that list.

TESTING FOR PRODUCTION

Every well-managed bull association should provide some means of keeping the production records of the dams and daughters. One of the best ways to do this is through the work of the cow-testing associations. For a long time cows have been culled and sent to the butcher because of their low cow-testing-association records. It is



FIG. 6.—Four daughters of one bull-association bull

now possible to cull the bulls and send them to the butcher because of the low cow-testing-association records of their daughters. The bull that does not get high-producing daughters is safe from the butcher a little longer than the low-producing cow, but he is not half as safe now as he once was. At last a way has been found to test him through the records of his daughters. For him the cow-testing association is a court of last resort. From its decision there is no appeal.

NOT MORE BUT BETTER DAIRY COWS

Proved bulls insure dairy-herd improvement. This manifests itself in larger production per cow, which increases the net income from the same number of cows or brings the same net income from a smaller number. In any case the farmer is the gainer. The figures in the following paragraph clearly show what may be gained by breeding up a herd of high-producing dairy cows.

In one instance there was a herd of 14 cows whose average yearly butterfat production per cow was 137 pounds, with an average income of \$25 over cost of feed. Another herd of 8 cows had an average yearly butterfat production of 314 pounds per cow and an average

income of \$87 over cost of feed. The 14-cow herd had a total income of \$350 over cost of feed, and the 8-cow herd, \$696. With one more than half as many cows the smaller herd had approximately twice the income over cost of feed.

The owner of the smaller herd could sleep an hour longer every morning and finish the feeding and milking as soon as the owner of the larger herd. In the evening he could finish his work and go to a movie while the owner of the larger herd was still busy feeding and milking his 14 low-producing cows. Not only that, but the owner of the smaller herd would have \$346 more to spend each year on necessities or on luxuries. Why anyone will milk and care for 14 poor cows when by joining a bull association he can breed up a herd of better cows is difficult to understand.

BULL ASSOCIATION KEEPS THE BEST

Through the system of transferring bulls from block to block, as will be explained under the next heading, the bull association makes it possible to keep all the bulls until their daughters have made records and until the records of dams and daughters have been compared. That system makes it possible to keep all the proved bulls as long as they live or are fit for service.

The well-managed bull association not only keeps the good bulls, but it culls the bad. No intelligent farmer would plant inferior seed corn if good seed were available; neither would he knowingly use a bull that would lower the production of his dairy herd. Until recently no simple, practical method was used by which bulls are tested for their ability to transmit high production to unselected daughters. Now there is no excuse for not thus testing the sires that head our dairy herds.

HOW TO ORGANIZE

If the dairymen of any community desire to organize a bull association they should obtain from their county agent, their State agricultural college, and the United States Department of Agriculture all the available literature on the subject, including copies of the constitution and by-laws in use in well-organized bull associations. After getting all the information possible on the subject of bull associations, they should consult with the county agent and the dairy extension field men from the State agricultural college regarding the details of organization and a canvass for membership.

If the membership canvass shows that an association can be organized in the community, a meeting of those interested should be held at which time the association may be formally organized. The State dairy extension field man should also be present at that meeting and act in an advisory capacity regarding the various steps to be taken in forming a satisfactory organization.

The constitution and by-laws adopted by the association should be brief and written in simple language. Copies of those in use in well-organized and successful bull associations may be obtained from the extension department of the State agricultural colleges, or from the Bureau of Dairy Industry of the United States Department of Agriculture.

WHO SHOULD JOIN

Most of the 248 bull associations now in operation are in those districts where the herds are small. These districts are the natural places for the work to begin because the entire cost of a well-bred bull is high per cow to the owner of the small herd. It does not follow, however, that the bull association is not adapted to those districts where the dairy herds are large. The dairy-bull association is adapted to every dairy district and to every farm on which dairy cows of any kind are kept.

Every dairyman in this country is a prospective member of such an organization. He has much to gain and nothing to lose by joining. If the owners of small herds can pool their small resources and buy good bulls, the owners of large herds can pool their larger resources and buy better bulls, while the owners of the best-bred dairy herds can pool their still greater resources and buy the best bulls available. Even if the financial question is no part of the problem, the farmers may work out some method of exchange suitable to their conditions and be greatly benefited thereby.

As a rule, it costs but little more and sometimes less to own a share in a well-bred dairy bull than to be the sole owner of an ordinary scrub. Not only is the original cost less but also the cost for feed and care is apportioned among all the members and falls lightly on each one. Though the cost of feed and care for the bull is apportioned among the members, the bulls are purchased and owned by the entire association.

Such organizations not only make it possible to purchase better bulls but also to use these good bulls much more extensively than they have been used in private ownership and to keep them as long as they are fit for service.

Certainly every cow-testing association might well consider the idea of organizing within itself a bull association. With equal force it may be said that every bull association should organize into an up-to-date cow-testing association, if possible. The cow-testing association herds need better breeding, and the bull-association herds need testing. These two associations working together can soon lift all our dairy herds to a higher level of production.

BULL-ASSOCIATION BLOCKS

A typical bull association consists of five blocks, each containing one or more herds. At least one bull is assigned to each block. In order to prevent inbreeding each bull is advanced to the next block in the circuit at the end of every two-year period.

In the well-managed bull association the cows with which the bulls are mated should be tested for production and their records kept on file to be compared later with the production records of the daughters. As soon as the daughters freshen their production records are kept, and as their lactation period advances the record of each is compared with the production record of the dam. Even if there is no cow-testing association to do the testing, the owner of the herd may keep a private record of the feed cost and production of each cow in his herd.

As soon as enough dam and daughter records have been obtained and compared, the association decides which bulls shall be kept and which shall be sent to the butcher. The money received from the sale of discarded bulls goes into the treasury of the association, and other bulls are bought to replace those that have been discarded. All the members of the entire association are assessed to meet any additional expense. Because all share this cost, the burden is light for everyone.

SELECTION OF BULLS

After the association has decided on the number of bulls to buy and the price limit, the committee appointed to purchase bulls should buy the best bulls obtainable at the price. It is unfortunate that as yet but few proved bulls are available.

The committee should endeavor to choose well-formed bulls descended from exceptionally high-producing dams and granddams. If this be done, the probabilities are that selected bulls will transmit to their offspring the high-producing qualities of the ancestors. Eventually the time will come when bulls will be selected on the records of descendants as well as on those of ancestors. When that time comes dairying will have completely eliminated another piece of guesswork.

ONE BREED FOR EACH ASSOCIATION

In the well-organized bull association only one breed of bull is used. As the bulls are shifted from block to block every two years it is essential that all should be of the same breed, and it is advisable that as far as possible all should be of like quality. Using bulls of the same breed and of like high quality gradually builds up herds of the same or similar breeding. Naturally, buyers looking for animals of this breed are attracted to this district.

A dairyman in northern Wisconsin kept a herd of Guernseys in a Holstein district, believing that he would have a monopoly of the business in that breed. He did have a monopoly, but he was greatly disappointed because buyers did not come his way. The buyers went to those districts where there were many Guernsey herds.

When buyers of dairy cattle want Guernseys, or Jerseys, or Holsteins, or Ayrshires, or Brown Swiss they go to those districts where there are large numbers of animals of their chosen breed. Therefore, by encouraging the building up of many herds of the same breed in a community the bull association brings a better sale of surplus stock.

BULL ASSOCIATION PICTURED

Figure 7 shows an average country district divided in such a way as to show the logical distribution of the five breeding blocks in a well-organized cooperative bull association. Near the center of each block stands a carefully selected, well-fed, purebred dairy bull of good type. His appearance indicates his breeding, and he stands there proudly as the mighty monarch of all the dairy herds within the limits of his district. In block No. 4 the bull heads a single

dairy herd, and in block No. 3 he stands at the head of the village herd. The picture is founded on what has actually occurred in one or more of the 248 active cooperative bull associations.

Had there been room for the artist to tell the story more in detail, the picture could have shown the clean, small, well-built but inexpensive barn in which the bull is housed; and it might have shown the strong fence that incloses the yard where the bull is allowed to move about at will. It could also have given the construction of the breeding rack where a cow may be bred to the largest and most vicious bull without endangering any human being in the least. And had the artist been able to tell all the story he could have

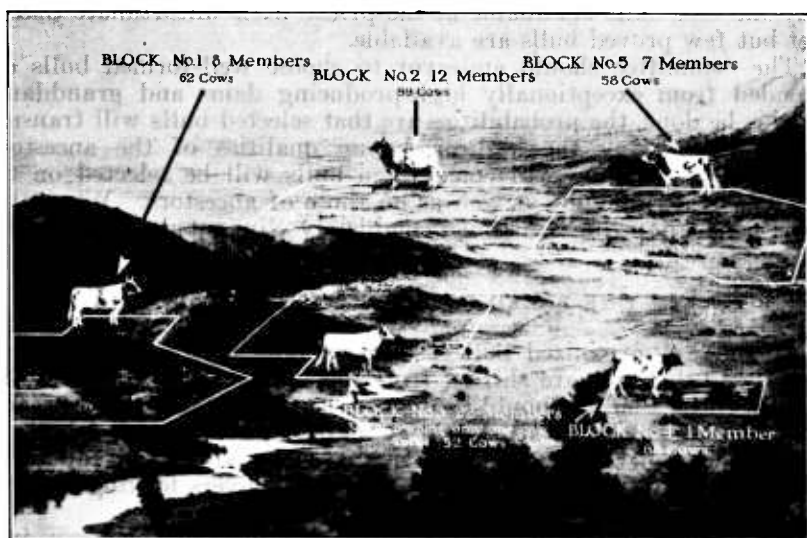


FIG. 7.—Arrangement of blocks

Painted many grade dairy herds in which the daughters would have had the color markings of their sires, and double or perhaps triple the production records of their dams.

A GREAT LOSS IN DAIRYING

Probably the greatest loss in dairying results from killing a large percentage of our best purebred bulls before their true value has been determined through the production records of the daughters. The well-managed bull association prevents this slaughter in its members' herds. This work should be extended by organizing many bull associations. Instead of hundreds, these organizations should be numbered in tens of thousands, and they should extend into every agricultural district in this country.

One reason given for killing these bulls is that they had become a dangerous menace to human life. There is a saying that it is usually the so-called harmless bull that kills his keeper, and that "the only safe bull is a dead bull." It may be truthfully said that the only safe living bull is the one that is kept continually in a

properly built bull pen. Painsstaking precautions should therefore be used at all times. Plans for a pen that will actually keep the bull where he can do no harm may be obtained from the State colleges of agriculture or from the United States Department of Agriculture.

There may be other ways of saving good bulls than through the work of the bull associations; ways that are better adapted to certain dairy districts and that will appeal to many dairymen, but the goal is always the same: The saving of all well-bred sires until their true value is known in order that the dairy herds may be improved.

The plan that will bring about this desired result will accomplish much for the dairy world. It will cut the cost of production on our dairy farms and gradually but certainly eliminate a great loss in dairying.



FIG. 8.—Automobile tour to farms of members of local bull association

LOOKING FORWARD

Considerable progress has been made in dairying by selecting for breeding purposes the descendants of high producers, but the most rapid progress can only be made by looking forward as well as backward. The records of the first five or six daughters determine with some degree of certainty the true value of a dairy bull; and it is doubtful whether any bull, regardless of his breeding, should head any well-bred herd until a number of his daughters have been tested and found to have much higher records than their dams. Until such time, however, as good proved sires are made available, bulls with high-producing ancestry must be relied upon. When all dairy bulls are required to pass through a probationary period before they are allowed to head a dairy herd, when only proved sires are allowed to become the sires of many daughters, and when the best of these sires are used to their full capacity, then, and not until then, may a great advance in the economical production of our dairy herds be expected.

The means of making this work successful are now at hand. The cow-testing association, at little cost, keeps the records of dams and daughters; and the bull association makes it possible to keep a good dairy sire for 10 or 12 years, or as long as he is fit for service without danger of inbreeding. Without fail, these two associations, when properly managed, will in a few generations transform poor scrub herds into herds of high production.

SUMMARY

The ultimate goal of the bull association is better cows.

The cooperative dairy-bull association is a farmers' organization whose chief purpose is the breeding of better dairy cows through the joint ownership, use, and systematic exchange of prepotent purebred dairy bulls of high-producing ancestry.

The dairyman of limited means is the one who can least afford the great losses that come from carelessness in breeding.

The first bull association in the United States was organized in Michigan in 1908. There are now 248 bull associations in 33 States.

A study of the records of the daughters of bull-association bulls showed an average yearly mature production of 8,071 pounds of milk and 342 pounds of butterfat. In milk production the daughters excelled the dams by 13.5 per cent and in butterfat production by 14.4 per cent.

Some of the sires are very outstanding. One sire was mated with cows having an average yearly milk production of 9,300 pounds and an average yearly butterfat production of 347 pounds, yet his seven daughters from these cows excelled their dams by 57 per cent in milk production and by 44 per cent in production of butterfat.

In many localities the banks are helping to finance the purchase of better dairy sires. One bank helped to finance the purchase of bulls for two bull associations.

Through the system of transferring bulls from block to block, the bull association makes it possible to keep all proved bulls as long as they live or are fit for service.

The State agricultural colleges and the Bureau of Dairy Industry of the United States Department of Agriculture will furnish information regarding the organization of bull associations.

In answer to the question, who should join a bull association, every dairyman is a prospective member. The bull association is adapted to every locality and to dairy herds of all sizes.

The typical bull association consists of five blocks to each of which one bull is assigned. All the bulls are owned by the association.

If possible proved bulls should be selected. When this is impossible the bulls should be selected on the production records of dams and granddams.

In a bull association the bulls must all be of the same breed.

Much progress has been made by selecting bulls on the records of their dams and granddams. The most rapid progress can not come until dairy sires are selected on the production records of their daughters.